Online Data Supplement

Table of Contents

Table E1. Exposures and covariates selected for study in the evaluation of characteristics and risk factors for COVID-19 outcomes in a Swedish population-based cohort of COPD patients on 1 Jan 2020.

Covariate	Units and Categories	Source and definition	Lookback window before index date
Comorbidity	**Units/Categories**	**Register source; Description**	
Age	As a continuous variable and in 10-year categories	RTB	2 years
Sex	Male, female	RTB	2 years
Region of birth	Sweden, Nordic, EU, Non-EU	RTB	2 years
Education	Primary, secondary, and higher	LISA; Primary education included pre-secondary education shorter than 9 years, equal to 9 years or more than 9 years. Secondary educated included 2-year high school education, secondary education shorter than 3 years or longer than 3 years, and higher education included those with post-high-school education	2 years
Employment status	Unemployed (40-64 years), employed (40-64 years), employed (65+ years) and retired (65+ years)	Created using the LISA variable "employment" and stratified by age where; "employed" were either employed or with entrepreneurial income, and "unemployed" were the unemployed and without entrepreneurial income. This variable was further grouped by age that included: unemployed and unemployed aged 40-64 years; employed 65+ and retired 65+.	2 years
Marital status	Married and non-married	LISA; derived from "Civil Status" from the LISA register. A binary variable was then created which grouped individuals as either married (including the married, and those with a registered partner) and not married (divorced/separated, divorced partner, widow(er), and surviving partner)	2 years
Smoking	Never smoker Former smoker	SNAR; available as a variable in the SNAR dataset that was not measured for all visits that the patients made to the	5 years

	Current smoker	healthcare facilities, and therefore, the last observed smoking status before index was used for this variable. Never smokers had never been smokers; former smokers quit smoking for at least 6 months; current smokers includes infrequent (non-daily smokers) and frequent smokers (1 to >20 cigarettes daily).	
Comorbidity	**Units/Categories**	**Register source; ICD Codes**	
Overall cardiovascular disease	Yes/No	NPR; I00-I99	5 years
Hypertension	Yes/No	NPR; I10-I15	5 years
Heart failure	Yes/No	NPR; I50	5 years
Type 1 diabetes	Yes/No	NPR; E10	5 years
Type 2 diabetes	Yes/No	NPR; E11	5 years
Asthma	Yes/No	NPR; J45	5 years
Respiratory failure	Yes/No	NPR; J96	5 years
Interstitial lung disease	Yes/No	NPR; J84	5 years
Sleep apnea syndromes	Yes/No	SNAR variable	5 years
Chronic kidney disease	Yes/No	NPR; N184 N185 Z992	5 years
Autoimmune disease	Yes/No	NPR; M05-M14	5 years
Cancer	Yes/No	NPR; C00-C97	5 years
Depression	Yes/No	NPR; F32, F33	5 years
Anxiety	Yes/No	NPR; F41	5 years
Psychiatric disorders	Yes/No	NPR; F20 F21 F22 F23 F24 F25 F26 F27 F28 F29 F30 F31 F32 F33 F34 F35 F36 F37 F38 F39	5 years
Medications	**Units/Categories**	**NPDR; ATC Codes**	
Inhaled corticosteroids	Yes/No	R03BA, R03AK , R03AL08, R03AL09	1 year
Oral corticosteroids	Yes/No	H02AB	1 year
Inhaled SABA	Yes/No	R03AC02, R03AC03	1 year
Inhaled LABA	Yes/No	R03AC12, R03AK06, R03AC13, R03AK07, R03AK08,	1 year

		R03AK11, R03AL05, R03AL07, R03AL09, R03AL11, R03AC19, R03AL06, R03AC18, R03AK14, R03AK10	
Inhaled SAMA	Yes/No	R03BB01, R03AL02	1 year
Inhaled LAMA	Yes/No	R03BB04, R03AL06, R03BB05, R03AL05, R03BB06, R03AL12, R03AL11, R03AL09, R03AL07, R03AL04, R03BB07, R03AL03, R03AL08	1 year
Xanthines	Yes/No	R03DA04	1 year
LTRA	Yes/No	R03DC03	1 year
Phospodiesterase 4 inhibitors	Yes/No	R03DX07	1 year
Statins	Yes/No	C10AA	1 year
ACEIs	Yes/No	C09A, C09B	1 year
ARBs	Yes/No	C09C, C09D	1 year
Antidepressants	Yes/No	N06A	1 year
Vaccination	Yes/No	Source: National vaccination register held by the Public Health Agency of Sweden; Vaccine types: BNT162b2, mRNA-1273 or AZD1222.	After index
Clinical measurements	**Categories**	**Source; Description**	
GOLD Classification	A = Mild, B = Moderate, C = Severe, D = Very severe	SNAR; GOLD ABCD classifications were created from SNAR data on number of total and hospitalized exacerbations in the year prior to index date, CAT and mMRC scores [E7]. A patient with one non-hospitalized exacerbation in the year before index date qualified for GOLD A or B, while GOLD C and D had ≥ 2 exacerbations or ≥ 1 hospitalized exacerbation in the prior year. GOLD A and C included patients who had a low symptom burden from CAT (<10) or a lower score on the mMRC scale (0-1), while GOLD B and D had higher symptom burden (CAT ≥10 or mMRC ≥2).	5 years
mMRC	Categorical variables	SNAR; defined as the most recent observations of the	5 years

	numbered on a scale of 0 to 4	modified Medical Research Council dyspnea scale (mMRC). The scale is similar to the guidelines in the Global Inititative for Chronic Obstructive Lung Disease: 0 = Breathlessness with strenuous exercise; 1 = Breathlessness when climbing a slight hill; 2 = Breathlessness leads to slower walk than people of the same age with stops to catch breath when walking alone; 3 = Stopping for breath after walking 100 meters; and 4 = Too breathless to leave the house.	
CAT	Continuous variable categorized into a binary variable <10 and ≥ 10	SNAR; defined as the most recent observations of the combined COPD assessment test (CAT). Used as a binary variable with a cutoff at CAT ≥ 10: <10 = lower symptom burden; and ≥ 10 higher symptom burden.	5 years
Spirometry	Categorical variable with levels; ≥ 80 (GOLD stage 1), 50-79 (GOLD stage 2), 30-49 (GOLD stage 3) and <30 (GOLD stage 4)	SNAR; Forced Expiratory Volume in one second, percent of predicted (FEV_1% predicted)	5 years
Body mass index (BMI)	Continuous variable	SNAR; available as a variable in the SNAR dataset that was not measured for all visits that the patients made to the healthcare facilities, and therefore, the last observed BMI value before index was used for this variable, with units in kg/m^2.	5 years
BMI categories	Underweight, Normal, Overweight, Obese	SNAR; This variable was created by grouping the last observed BMI values into four categories according to the WHO BMI classification as “underweight” (BMI < 18.5), “normal” (BMI =18.5 to 24.0), “overweight” (BMI = 25.0 to 29.9) and “obese” (BMI above 30).	5 years

RTB = register of total populations; LISA = longitudinal integrated database for health insurance and labor market studies; SNAR = Swedish national airways register; NPR = National Patient Register; NPDR = National Prescribed Drugs Register; ICD-10 = International Classification of Diseases, revision 10 ; ATC = anatomical therapeutic chemical; SABA = short-acting bronchodilator agonists; LABA = long-acting bronchodilator agonists; SAMA = short-acting muscarinic antagonists; LAMA = long-acting muscarinic antagonists; LTRA = leukotriene receptor antagonists; ACE = angiotensin converting enzyme inhibitors; ARB = angiotensin receptor blockers; GOLD = Global initiative of chronic obstructive pulmonary disease; mMRC = modified Medical Research Council dyspnea scale; CAT = COPD Assessment Test ; BMI = body mass index; WHO = world health organization.

Table E2. Prescribed medications taken in the year before 1 Jan 2020 by a population-based cohort of COPD patients (≥40 years) in Sweden , and by individuals with four different COVID-19 outcome events that occurred during unvaccinated and vaccinated follow-up time from 1 Jan 2020 to 30 Nov 2021 in that cohort.

	Total COPD cohort N = 87472	COPD patients with COVID-19 outcomes during vaccinated and unvaccinated follow-up time†							
		Infected		Hospitalized		ICU admitted		Death	
		Unvaccinated	Vaccinated	Unvaccinated	Vaccinated	Unvaccinated	Vaccinated	Unvaccinated	Vaccinated
N (%)	(Vaccinated by end of follow-up N= 77355)	N = 6068	N = 703	N = 2649	N = 248	N = 221	N = 12	N = 803	N = 79
Inhaled corticosteroids	41783 (47.8)	3208 (52.9)	379 (53.9)	1507 (56.9)	140 (56.5)	128 (57.9)	10 (83.3)	463 (57.7)	46 (58.2)
Oral corticosteroids	21275 (24.3)	1695 (27.9)	197 (28.0)	830 (31.3)	76 (30.6)	68 (30.8)	6 (50.0)	228 (28.4)	26 (32.9)
Inhaled SABA	37018 (42.3)	2734 (45.1)	311 (44.2)	1233 (46.5)	110 (44.4)	111 (50.2)	8 (66.7)	358 (44.6)	33 (41.8)
Inhaled LABA	42120 (48.2)	3106 (51.2)	361 (51.4)	1490 (56.2)	136 (54.8)	128 (57.9)	10 (83.3)	462 (57.5)	42 (53.2)
Inhaled SAMA	3502 (4.0)	382 (6.3)	36 (5.1)	219 (8.3)	18 (7.3)	13 (5.9)	0 (0.0)	93 (11.6)	5 (6.3)
Inhaled LAMA	49626 (56.7)	3470 (57.2)	408 (58.0)	1701 (64.2)	156 (62.9)	142 (64.3)	7 (58.3)	503 (62.6)	46 (58.2)
Xanthines	158 (0.2)	11 (0.2)	2 (0.3)	8 (0.3)	0 (0.0)	1 (0.5)	0 (0.0)	2 (0.2)	0 (0.0)
LTRA	2426 (2.8)	196 (3.2)	26 (3.7)	75 (2.8)	7 (2.8)	7 (3.2)	0 (0.0)	23 (2.9)	0 (0.0)
PDE4	910 (1.0)	68 (1.1)	17 (2.4)	40 (1.5)	12 (4.8)	1 (0.5)	0 (0.0)	15 (1.9)	2 (2.5)
Statins	33040 (37.8)	2233 (36.8)	272 (38.7)	1131 (42.7)	118 (47.6)	106 (48.0)	6 (50.0)	342 (42.6)	33 (41.8)
ACEIs	18181 (20.8)	1288 (21.2)	150 (21.3)	655 (24.7)	65 (26.2)	57 (25.8)	5 (41.7)	207 (25.8)	24 (30.4)
ARB	24059 (27.5)	1611 (26.5)	199 (28.3)	791 (29.9)	77 (31.0)	79 (35.7)	3 (25.0)	210 (26.2)	16 (20.3)
Antidepressants	20797 (23.8)	1719 (28.3)	207 (29.4)	773 (29.2)	74 (29.8)	56 (25.3)	1 (8.3)	285 (35.5)	22 (27.8)

ICU = intensive care unit; SABA = short-acting bronchodilator agonists; LABA = long-acting bronchodilator agonists; SAMA = short-acting muscarinic antagonists; LAMA = long-acting muscarinic antagonists; LTRA = leukotriene receptor antagonists; PDE-4 = phosphodiesterase-4 inhibitors; ACE = angiotensin converting enzyme inhibitors; ARB = angiotensin receptor blockers.

Table E3. Association between sociodemographics, comorbidities, prescribed medications and clinical characteristics of a population-based COPD cohort in Sweden and four COVID-19 outcomes – infection and hospitalization (**E3a**), and intensive care unit (ICU) admission and death (**E3b**) - that occurred during unvaccinated follow-up time from 1 Jan 2020 until 30 Nov 2021.

E3a)

	COVID-19 infection				COVID-19 hospitalization			
Total number of events	6068				2649			
Person years	106981				108282			
	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value	Unadj. HR [95% CI]	p-value	Adj.HR [95% CI] *	p-value
Sociodemographics								
Age categories †								
40-49	Ref. 40-49		Ref. 40-49		Ref. 40-49		Ref. 40-49	
50-59	0.95 [0.79-1.14]	0.571	0.92 [0.76-1.10]	0.367	2.15 [1.16-3.98]	0.015	1.90 [1.02-3.52]	0.042
60-69	0.67 [0.56-0.80]	<0.001	0.60 [0.50-0.71]	<0.001	2.93 [1.61-5.32]	<0.001	2.29 [1.26-4.17]	0.007
70-79	0.55 [0.47-0.66]	<0.001	0.43 [0.36-0.52]	<0.001	4.15 [2.29-7.53]	<0.001	2.76 [1.52-5.01]	0.001
80-89	0.86 [0.72-1.02]	0.082	0.61 [0.50-0.73]	<0.001	6.87 [3.78-12.48]	<0.001	4.08 [2.24-7.43]	<0.001
90+	1.59 [1.29-1.97]	<0.001	1.05 [0.83-1.32]	0.703	11.42 [6.16-21.2]	<0.001	6.37 [3.39-11.97]	<0.001
Gender †								
Male	Ref.		Ref.		Ref.		Ref.	
Female	0.87 [0.82-0.91]	<0.001	0.88 [0.83-0.93]	<0.001	0.73 [0.67-0.79]	<0.001	0.73 [0.67-0.79]	<0.001
Education a								
Primary	Ref.		Ref.		Ref.		Ref.	
Secondary	0.97 [0.91-1.03]	0.292	0.99 [0.93-1.05]	0.755	0.83 [0.76-0.91]	<0.001	0.94 [0.86-1.03]	0.196
Higher	0.87 [0.81-0.95]	0.001	0.88 [0.81-0.96]	0.004	0.72 [0.63-0.81]	<0.001	0.79 [0.69-0.90]	<0.001
Marital status								
Non-married	Ref.		Ref.		Ref.		Ref.	
Married	1.02 [0.97-1.08]	0.434	1.00 [0.95-1.06]	0.967	0.92 [0.85-1.00]	0.044	0.86 [0.78-0.93]	0.001
Employment status								

Unemployed (40-64 years)	Ref.		Ref.		Ref.		Ref.	
Employed (40-64 years)	1.43 [1.28-1.59]	<0.001	1.40 [1.25-1.57]	<0.001	0.61 [0.49-0.76]	<0.001	0.69 [0.54-0.86]	0.001
Employed (65+ years)	0.85 [0.75-0.96]	0.007	0.89 [0.77-1.02]	0.104	1.06 [0.87-1.30]	0.536	0.80 [0.63-1.02]	0.068
Retired (65+ years)	0.99 [0.89-1.09]	0.793	0.94 [0.82-1.07]	0.324	1.66 [1.41-1.96]	<0.001	1.01 [0.8-1.26]	0.956
Region of birth								
Sweden	Ref.		Ref.		Ref.		Ref.	
Nordic	1.11 [1.00-1.24]	0.046	1.11 [0.99-1.24]	0.07	1.22 [1.04-1.42]	0.012	1.23 [1.05-1.44]	0.012
Other EU	1.18 [1.03-1.35]	0.016	1.11 [0.96-1.28]	0.15	1.50 [1.25-1.80]	<0.001	1.42 [1.17-1.73]	<0.001
Non-EU	1.87 [1.73-2.03]	<0.001	1.73 [1.59-1.89]	<0.001	1.86 [1.65-2.10]	<0.001	2.13 [1.87-2.42]	<0.001
Smoking †								
Never smoker	Ref.		Ref.		Ref.		Ref.	
Former smoker	0.90 [0.84-0.97]	0.008	0.96 [0.89-1.04]	0.327	0.90 [0.81-1.00]	0.059	1.00 [0.89-1.11]	0.981
Current smoker	0.61 [0.56-0.66]	<0.001	0.62 [0.56-0.67]	<0.001	0.48 [0.42-0.54]	<0.001	0.62 [0.54-0.72]	<0.001
Comorbidities								
Overall cardiovascular disease	1.48 [1.40-1.56]	<0.001	1.30 [1.20-1.42]	<0.001	2.67 [2.45-2.92]	<0.001	1.82 [1.6-2.08]	<0.001
Hypertension †	1.44 [1.36-1.52]	<0.001	1.35 [1.27-1.43]	<0.001	2.24 [2.07-2.43]	<0.001	1.70 [1.55-1.86]	<0.001
Heart failure	1.95 [1.81-2.10]	<0.001	1.62 [1.49-1.76]	<0.001	3.13 [2.85-3.44]	<0.001	2.00 [1.80-2.23]	<0.001
Type 1 diabetes	1.48 [1.21-1.81]	<0.001	1.16 [0.94-1.43]	0.165	1.94 [1.49-2.53]	<0.001	1.23 [0.93-1.62]	0.154
Type 2 diabetes †	1.47 [1.37-1.58]	<0.001	1.30 [1.20-1.40]	<0.001	2.12 [1.93-2.34]	<0.001	1.54 [1.38-1.72]	<0.001
Asthma	1.29 [1.19-1.41]	<0.001	1.09 [1.00-1.19]	0.053	1.53 [1.36-1.72]	<0.001	1.26 [1.11-1.43]	<0.001
Respiratory failure	2.02 [1.80-2.26]	<0.001	1.78 [1.58-2.02]	<0.001	3.23 [2.81-3.71]	<0.001	2.51 [2.16-2.91]	<0.001
Interstitial lung disease	1.09 [0.77-1.56]	0.616	1.10 [0.77-1.56]	0.612	1.83 [1.21-2.76]	0.004	1.61 [1.07-2.43]	0.024
Sleep apnea syndromes	1.15 [1.00-1.32]	0.043	0.98 [0.85-1.13]	0.745	1.41 [1.17-1.70]	<0.001	1.11 [0.91-1.35]	0.288
Chronic kidney disease	2.02 [1.67-2.45]	<0.001	1.54 [1.25-1.90]	<0.001	3.06 [2.42-3.87]	<0.001	1.67 [1.29-2.17]	<0.001
Immunologic disease	0.99 [0.51-1.90]	0.974	0.67 [0.30-1.50]	0.335	1.74 [0.83-3.66]	0.143	1.06 [0.40-2.84]	0.903
Autoimmune disease	1.45 [1.32-1.58]	<0.001	1.31 [1.19-1.44]	<0.001	1.96 [1.74-2.21]	<0.001	1.51 [1.33-1.72]	<0.001
Cancer	1.12 [1.04-1.20]	0.003	1.06 [0.98-1.15]	0.145	1.45 [1.31-1.61]	<0.001	1.13 [1.01-1.26]	0.029

Depression	1.33 [1.18-1.50]	<0.001	1.28 [1.13-1.46]	<0.001	1.52 [1.28-1.80]	<0.001	1.70 [1.42-2.04]	<0.001
Anxiety	1.26 [1.12-1.41]	<0.001	1.18 [1.04-1.34]	0.011	1.39 [1.17-1.64]	<0.001	1.53 [1.28-1.84]	<0.001
Psychiatric disease	1.33 [1.20-1.47]	<0.001	1.32 [1.18-1.47]	<0.001	1.44 [1.24-1.67]	<0.001	1.74 [1.49-2.04]	<0.001
Prescribed medications								
Inhaled corticosteroids	1.27 [1.21-1.34]	<0.001	1.21 [1.14-1.28]	<0.001	1.48 [1.37-1.61]	<0.001	1.38 [1.27-1.51]	<0.001
Oral corticosteroids	1.26 [1.19-1.34]	<0.001	1.20 [1.13-1.28]	<0.001	1.47 [1.35-1.60]	<0.001	1.32 [1.21-1.45]	<0.001
Inhaled SABA	1.14 [1.08-1.20]	<0.001	1.12 [1.06-1.18]	<0.001	1.19 [1.10-1.29]	<0.001	1.21 [1.11-1.32]	<0.001
Inhaled LABA	1.18 [1.12-1.24]	<0.001	1.14 [1.07-1.20]	<0.001	1.42 [1.31-1.54]	<0.001	1.30 [1.20-1.42]	<0.001
Inhaled SAMA	1.89 [1.70-2.11]	<0.001	1.62 [1.44-1.83]	<0.001	2.47 [2.13-2.86]	<0.001	2.01 [1.71-2.35]	<0.001
Inhaled LAMA	1.08 [1.03-1.15]	0.003	1.10 [1.04-1.16]	0.001	1.45 [1.33-1.57]	<0.001	1.33 [1.22-1.46]	<0.001
Xanthines	1.13 [0.61-2.11]	0.693	1.03 [0.53-1.98]	0.934	2.05 [1.03-4.11]	0.042	1.71 [0.81-3.59]	0.157
LTRA	1.16 [0.99-1.34]	0.062	1.04 [0.89-1.22]	0.593	1.09 [0.86-1.38]	0.477	1.08 [0.85-1.38]	0.521
PDE4	1.17 [0.91-1.49]	0.218	1.11 [0.86-1.43]	0.417	1.48 [1.06-2.05]	0.02	1.37 [0.99-1.91]	0.059
Statins	1.00 [0.95-1.06]	0.964	0.92 [0.86-0.98]	0.009	1.26 [1.17-1.37]	<0.001	0.92 [0.84-1.01]	0.072
ACEIs	1.06 [0.99-1.13]	0.079	0.98 [0.92-1.05]	0.646	1.29 [1.17-1.41]	<0.001	1.04 [0.94-1.15]	0.44
ARB	0.97 [0.91-1.03]	0.322	0.87 [0.81-0.93]	<0.001	1.15 [1.05-1.25]	0.002	0.87 [0.79-0.95]	0.003
Antidepressants	1.32 [1.24-1.40]	<0.001	1.32 [1.24-1.41]	<0.001	1.37 [1.25-1.49]	<0.001	1.44 [1.31-1.59]	<0.001
Clinical measurements								
GOLD Classes b								
Class A	Ref.		Ref.		Ref.		Ref.	
Class B	1.10 [1.01-1.20]	0.027	1.08 [0.99-1.18]	0.098	1.52 [1.31-1.76]	<0.001	1.41 [1.22-1.64]	<0.001
Class C	1.22 [1.05-1.40]	0.008	1.19 [1.03-1.39]	0.018	1.58 [1.26-1.99]	<0.001	1.51 [1.19-1.91]	0.001
Class D	1.37 [1.24-1.52]	<0.001	1.31 [1.18-1.46]	<0.001	2.09 [1.78-2.45]	<0.001	1.92 [1.63-2.26]	<0.001
FEV1 % predicted c								
>=80	Ref.		Ref.		Ref.		Ref.	
50-79	0.99 [0.91-1.09]	0.877	1.02 [0.93-1.11]	0.734	1.17 [1.01-1.37]	0.039	1.18 [1.01-1.38]	0.04
30-49	1.06 [0.95-1.17]	0.296	1.10 [0.99-1.23]	0.068	1.65 [1.40-1.95]	<0.001	1.53 [1.29-1.82]	<0.001

<30	1.17 [0.99-1.37]	0.062	1.19 [1.01-1.41]	0.038	2.10 [1.67-2.65]	<0.001	2.03 [1.60-2.58]	<0.001
CAT								
<10			Ref.				Ref.	
≥ 10	1.17 [1.11-1.25]	<0.001	1.13 [1.07-1.21]	<0.001	1.45 [1.32-1.60]	<0.001	1.41 [1.28-1.56]	<0.001
mMRC dyspnea scale d							Ref.	
0	Ref.		Ref.		Ref.			
1	1.04 [0.95-1.12]	0.407	1.02 [0.94-1.12]	0.585	1.08 [0.95-1.22]	0.266	1.02 [0.89-1.17]	0.769
2	1.07 [0.98-1.18]	0.137	1.06 [0.96-1.17]	0.218	1.23 [1.07-1.42]	0.004	1.13 [0.98-1.32]	0.097
3	1.21 [1.09-1.34]	<0.001	1.14 [1.02-1.26]	0.017	1.59 [1.37-1.85]	<0.001	1.37 [1.17-1.60]	<0.001
4	1.12 [1.00-1.25]	0.055	1.08 [0.96-1.21]	0.215	1.26 [1.06-1.50]	0.009	1.09 [0.91-1.31]	0.358
Body mass index (BMI) e †								
Underweight	1.15 [1.01-1.32]	0.032	1.21 [1.06-1.38]	0.005	1.44 [1.21-1.73]	<0.001	1.54 [1.29-1.84]	<0.001
Normal BMI	Ref.		Ref.		Ref.		Ref.	
Overweight	1.05 [0.98-1.12]	0.158	1.02 [0.95-1.09]	0.637	0.92 [0.83-1.02]	0.125	0.88 [0.80-0.98]	0.019
Obese	1.17 [1.10-1.26]	<0.001	1.10 [1.02-1.18]	0.011	1.23 [1.11-1.36]	<0.001	1.19 [1.07-1.32]	0.001

E3b)

	COVID-19 ICU admission				COVID-19 death			
Total number of events	221				803			
Person years	109272				109342			
	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value
Sociodemographics								
Age categories †								
40-49								
50-59	Ref. 50-59		Ref. 50-59		Ref. 50-59		Ref. 50-59	
60-69	1.31 [0.82-2.10]	0.251	1.09 [0.68-1.75]	0.724	3.51 [1.81-6.78]	<0.001	2.66 [1.37-5.18]	0.004

70-79	1.25 [0.79-1.97]	0.333	0.92 [0.57-1.48]	0.735	7.92 [4.2-14.94]	<0.001	5.27 [2.78-9.99]	<0.001
80-89	0.46 [0.23-0.89]	0.021	0.31 [0.15-0.63]	0.001	21.44 [11.37-40.43]	<0.001	13.04 [6.85-24.85]	<0.001
90+					43.55 [22.31-85.02]	<0.001	24.3 [12.10-48.80]	<0.001
Gender †								
Male	Ref.		Ref.		Ref.		Ref.	
Female	0.58 [0.44-0.76]	<0.001	0.64 [0.48-0.86]	0.003	0.65 [0.56-0.76]	<0.001	0.63 [0.54-0.75]	<0.001
Education a								
Primary	Ref.		Ref.		Ref.		Ref.	
Secondary	0.74 [0.54-1.00]	0.053	0.74 [0.54-1.02]	0.067	0.70 [0.60-0.82]	<0.001	0.92 [0.77-1.09]	0.316
Higher	0.73 [0.48-1.10]	0.132	0.73 [0.48-1.13]	0.159	0.54 [0.43-0.69]	<0.001	0.66 [0.51-0.85]	0.001
Marital status								
Non-married	Ref.		Ref.		Ref.		Ref.	
Married	1.21 [0.92-1.6]	0.169	1.04 [0.78-1.39]	0.804	0.81 [0.69-0.94]	0.007	0.75 [0.63-0.89]	0.001
Employment status								
Unemployed (40-64 years)	Ref.		Ref.		Ref.		Ref.	
Employed (40-64 years)	0.51 [0.28-0.93]	0.029	0.47 [0.25-0.87]	0.017	0.29 [0.14-0.62]	0.001	0.40 [0.18-0.87]	0.021
Employed (65+ years)	1.09 [0.65-1.84]	0.749	1.27 [0.67-2.42]	0.471	1.35 [0.81-2.27]	0.253	0.74 [0.39-1.41]	0.353
Retired (65+ years)	0.84 [0.54-1.33]	0.459	1.22 [0.66-2.26]	0.519	4.32 [2.79-6.69]	<0.001	1.64 [0.91-2.99]	0.102
Region of birth								
Sweden	Ref.		Ref.		Ref.		Ref.	
Nordic	1.56 [0.94-2.59]	0.085	1.48 [0.86-2.53]	0.155	1.30 [0.99-1.69]	0.056	1.19 [0.89-1.60]	0.233
Other EU	2.66 [1.58-4.48]	<0.001	2.49 [1.45-4.27]	0.001	1.59 [1.15-2.19]	0.005	1.30 [0.91-1.86]	0.15
Non-EU	3.18 [2.24-4.50]	<0.001	2.66 [1.83-3.87]	<0.001	1.10 [0.84-1.44]	0.489	1.29 [0.96-1.75]	0.09
Smoking †								
Never smoker	Ref.		Ref.		Ref.		Ref.	
Former smoker	1.05 [0.72-1.53]	0.79	0.98 [0.67-1.43]	0.917	0.80 [0.66-0.97]	0.026	1.00 [0.82-1.21]	0.961
Current smoker	0.41 [0.26-0.67]	<0.001	0.41 [0.25-0.67]	<0.001	0.41 [0.32-0.53]	<0.001	0.76 [0.59-0.98]	0.032

Comorbidities								
Overall cardiovascular disease	1.90 [1.43-2.53]	<0.001	1.85 [1.22-2.81]	0.004	5.30 [4.35-6.45]	<0.001	2.80 [2.16-3.64]	<0.001
Hypertension †	1.72 [1.30-2.27]	<0.001	1.34 [0.98-1.84]	0.065	3.41 [2.92-3.98]	<0.001	2.12 [1.78-2.52]	<0.001
Heart failure	1.88 [1.29-2.74]	0.001	1.36 [0.90-2.04]	0.145	5.06 [4.33-5.91]	<0.001	2.55 [2.13-3.05]	<0.001
Type 1 diabetes	1.63 [0.60-4.37]	0.336	0.95 [0.35-2.60]	0.918	2.68 [1.77-4.07]	<0.001	1.71 [1.11-2.63]	0.015
Type 2 diabetes †	2.24 [1.62-3.10]	<0.001	1.66 [1.15-2.37]	0.006	2.54 [2.15-3.01]	<0.001	1.72 [1.42-2.08]	<0.001
Asthma	1.69 [1.15-2.49]	0.008	1.36 [0.90-2.04]	0.145	1.70 [1.38-2.09]	<0.001	1.32 [1.05-1.66]	0.018
Respiratory failure	2.19 [1.25-3.84]	0.006	1.9 [1.05-3.45]	0.034	4.14 [3.30-5.20]	<0.001	2.77 [2.15-3.58]	<0.001
Interstitial lung disease	0.95 [0.13-6.79]	0.961	0.9 [0.13-6.41]	0.914	2.93 [1.61-5.31]	<0.001	2.37 [1.30-4.30]	0.005
Sleep apnea syndromes	2.69 [1.66-4.37]	<0.001	1.54 [0.93-2.54]	0.092	1.19 [0.82-1.72]	0.361	1.06 [0.72-1.55]	0.777
Chronic kidney disease	2.58 [1.06-6.28]	0.036	1.19 [0.38-3.76]	0.769	4.95 [3.52-6.95]	<0.001	2.21 [1.52-3.23]	<0.001
Immunologic disease	NA	NA	NA		2.51 [0.81-7.80]	0.112	1.04 [0.15-7.43]	0.966
Autoimmune disease	1.32 [0.81-2.14]	0.262	1.11 [0.66-1.87]	0.682	2.77 [2.28-3.36]	<0.001	1.95 [1.58-2.41]	<0.001
Cancer	0.99 [0.66-1.48]	0.961	0.92 [0.60-1.41]	0.705	1.61 [1.34-1.93]	<0.001	1.07 [0.88-1.30]	0.513
Depression	1.88 [1.11-3.18]	0.019	1.96 [1.13-3.40]	0.017	1.63 [1.20-2.20]	0.002	2.01 [1.45-2.80]	<0.001
Anxiety	1.58 [0.92-2.71]	0.101	1.69 [0.95-30.0]	0.072	1.51 [1.12-2.04]	0.007	1.66 [1.18-2.33]	0.004
Psychiatric disease	1.46 [0.89-2.41]	0.133	1.54 [0.92-2.60]	0.103	1.68 [1.31-2.17]	<0.001	2.37 [1.80-3.13]	<0.001
Prescribed medications								
Inhaled corticosteroids	1.56 [1.18-2.06]	0.002	1.45 [1.09-1.94]	0.012	1.55 [1.33-1.80]	<0.001	1.42 [1.20-1.66]	<0.001
Oral corticosteroids	1.42 [1.06-1.92]	0.021	1.39 [1.02-1.89]	0.038	1.32 [1.12-1.55]	0.001	1.11 [0.93-1.32]	0.261
Inhaled SABA	1.39 [1.06-1.83]	0.019	1.32 [1.00-1.76]	0.054	1.12 [0.96-1.29]	0.146	1.20 [1.03-1.41]	0.023
Inhaled LABA	1.51 [1.15-2.00]	0.004	1.50 [1.12-2.01]	0.007	1.49 [1.28-1.73]	<0.001	1.31 [1.12-1.54]	0.001
Inhaled SAMA	1.58 [0.86-2.90]	0.14	1.68 [0.91-3.10]	0.096	3.64 [2.90-4.57]	<0.001	2.45 [1.89-3.18]	<0.001
Inhaled LAMA	1.60 [1.20-2.15]	0.002	1.66 [1.22-2.27]	0.001	1.40 [1.20-1.64]	<0.001	1.20 [1.01-1.41]	0.037
Xanthines	3.07 [0.43-21.89]	0.263	2.90 [0.41-20.79]	0.289	1.71 [0.43-6.85]	0.449	0.86 [0.12-6.15]	0.884
LTRA	1.24 [0.59-2.65]	0.569	0.91 [0.40-2.06]	0.825	1.13 [0.74-1.72]	0.584	1.25 [0.80-1.96]	0.322
PDE4	0.49 [0.07-3.47]	0.472	0.43 [0.06-3.04]	0.395	2.08 [1.25-3.47]	0.005	1.79 [1.03-3.10]	0.039

Statins	1.54 [1.17-2.03]	0.002	1.17 [0.86-1.61]	0.312	1.34 [1.15-1.55]	<0.001	0.88 [0.74-1.04]	0.124
ACEIs	1.43 [1.05-1.96]	0.022	1.19 [0.86-1.65]	0.298	1.39 [1.18-1.65]	<0.001	1.03 [0.86-1.23]	0.775
ARB	1.57 [1.18-2.09]	0.002	1.13 [0.83-1.54]	0.446	0.97 [0.82-1.14]	0.676	0.64 [0.53-0.77]	<0.001
Antidepressants	1.24 [0.91-1.69]	0.18	1.32 [0.95-1.83]	0.094	1.78 [1.52-2.08]	<0.001	1.92 [1.62-2.27]	<0.001
Clinical measurements								
GOLD Classes b								
Class A	Ref.		Ref.		Ref.		Ref.	
Class B	1.64 [0.97-2.78]	0.064	1.73 [1.01-2.97]	0.046	1.67 [1.24-2.25]	0.001	1.58 [1.15-2.16]	0.004
Class C	1.78 [0.80-3.97]	0.157	1.69 [0.73-3.93]	0.219	1.40 [0.86-2.29]	0.18	1.36 [0.80-2.30]	0.256
Class D	2.48 [1.41-4.39]	0.002	2.67 [1.48-4.78]	0.001	2.69 [1.96-3.70]	<0.001	2.39 [1.71-3.35]	<0.001
FEV1 % predicted c								
>=80	Ref.		Ref.		Ref.		Ref.	
50-79	0.60 [0.40-0.90]	0.014	0.54 [0.35-0.83]	0.004	1.27 [0.93-1.73]	0.134	1.24 [0.91-1.70]	0.175
30-49	0.52 [0.31-0.89]	0.016	0.54 [0.31-0.92]	0.024	1.61 [1.14-2.26]	0.006	1.39 [0.98-1.96]	0.064
<30	0.69 [0.29-1.63]	0.395	0.81 [0.34-1.97]	0.65	1.97 [1.21-3.18]	0.006	1.93 [1.17-3.18]	0.01
CAT								
<10			Ref.				Ref.	
≥ 10	1.78 [1.27-2.51]	0.001	1.74 [1.22-2.47]	0.002	1.48 [1.24-1.76]	<0.001	1.43 [1.18-1.72]	<0.001
mMRC dyspnea scale d								
0	Ref.		Ref.		Ref.		Ref.	
1	1.47 [0.93-2.34]	0.102	1.58 [0.96-2.59]	0.071	1.16 [0.91-1.47]	0.237	1.08 [0.83-1.40]	0.581
2	1.31 [0.78-2.22]	0.306	1.32 [0.75-2.30]	0.335	1.22 [0.93-1.59]	0.153	1.10 [0.82-1.46]	0.539
3	1.75 [1.02-3.02]	0.042	1.86 [1.05-3.28]	0.034	1.67 [1.27-2.21]	<0.001	1.38 [1.03-1.86]	0.034
4	1.22 [0.63-2.35]	0.558	1.13 [0.56-2.29]	0.735	1.45 [1.05-1.99]	0.022	1.25 [0.90-1.74]	0.19
Body mass index (BMI) e †								
Underweight	1.13 [0.39-3.21]	0.824	1.27 [0.44-3.62]	0.656	1.55 [1.15-2.09]	0.004	1.69 [1.25-2.29]	0.001
Normal BMI	Ref.		Ref.		Ref.		Ref.	

Overweight	2.78 [1.80-4.28]	<0.001	2.47 [1.60-3.81]	<0.001	0.77 [0.64-0.92]	0.005	0.75 [0.62-0.90]	0.003
Obese	4.29 [2.82-6.55]	<0.001	3.52 [2.29-5.40]	<0.001	1.01 [0.84-1.21]	0.949	1.07 [0.88-1.30]	0.483

adj.HR = adjusted hazard ratios; CI = confidence interval; EU=Europe; Ref=Reference group;
ACE = angiotensin converting enzyme inhibitors; ARB = angiotensin receptor blockers; SABA= short-acting bronchodilator agonists; LABA= long-acting bronchodilator agonists; SAMA = short-acting muscarinic antagonists; LAMA = long-acting muscarinic antagonists; LTRA=leukotriene receptor antagonists; PDE-4 = phosphodiesterase-4 inhibitors. GOLD = global initiative for chronic obstructive lung disease; FEV_1=forced expiratory volume in 1 second; ICU = intensive care unit; CAT = chronic obstructive pulmonary disease assessment test; mMRC = modified Medical Research Council; NA= Not applicable

* Models adjusted for age, sex, smoking, BMI, diabetes, and hypertension. Models have reduced sample size due to missing values, see table E6.
† Models including the same variable are not adjusted for it.

[a] Significant trend across education levels for COVID-19 hospitalization ($p < 0.001$) and death ($p < 0.001$).
[b] Significant trend across GOLD ABCD for COVID-19 hospitalization ($p < 0.001$) and death ($p = 0.001$).
[c] Significant trend across FEV_1 % predicted levels for COVID-19 infection ($p = 0.011$), hospitalization ($p < 0.001$) and ICU admission ($p < 0.001$).
[d] Significant trend across mMRC dyspnea scale for COVID-19 infection ($p < 0.001$)
[e] Significant trend across BMI levels categories for COVID-19 infection ($p < 0.001$), hospitalization ($p < 0.001$) and ICU admission ($p < 0.001$).

Table E4 Association between sociodemographics, comorbidities, prescribed medications and clinical characteristics of a population-based COPD cohort in Sweden and four COVID-19 outcomes (infection, hospitalization, intensive care unit (ICU) admission and death) that occurred during unvaccinated follow-up time from from 1 Jan 2020 until 30 Nov 2021 from a multivariable regression model containing all investigated characteristics except GOLD[a] and FEV_1[a].

	COVID-19 infection		COVID-19 hospitalization		COVID-19 ICU admission		COVID-19 death	
Total number of events	6068		2649		221		803	
Person years	106981		108282		109272		109342	
	Adj. HR [95% CI] *	p-value	Adj.HR [95% CI] *	p-value	Adj. HR [95% CI] *	p-value	Adj. HR [95% CI] *	p-value
Sociodemographics								
Age categories								
40-49	Ref. 40-49		Ref. 40-49					
50-59	0.98 [0.82-1.18]	0.855	1.88 [1.01-3.49]	0.045	Ref. 50-59		Ref. 50-59	
60-69	0.79 [0.66-0.96]	0.017	2.09 [1.13-3.86]	0.019	0.72 [0.39-1.35]	0.312	1.77 [0.79-3.97]	0.163
70-79	0.68 [0.55-0.84]	<0.001	2.44 [1.30-4.59]	0.006	0.52 [0.25-1.09]	0.083	2.56 [1.08-6.08]	0.033
80-89	0.94 [0.75-1.17]	0.557	3.44 [1.82-6.50]	<0.001	0.18 [0.07-0.46]	<0.001	5.75 [2.41-13.72]	<0.001
90+	1.54 [1.19-2.01]	0.001	4.94 [2.54-9.62]	<0.001			10.04 [4.03-24.98]	<0.001
Gender								
Male	Ref.		Ref.		Ref.		Ref.	
Female	0.87 [0.82-0.93]	<0.001	0.69 [0.63-0.75]	<0.001	0.66 [0.48-0.90]	0.009	0.53 [0.44-0.63]	<0.001
Education								
Primary	Ref.		Ref.		Ref.		Ref.	
Secondary	1.00 [0.94-1.07]	0.961	0.97 [0.88-1.07]	0.541	0.80 [0.58-1.10]	0.164	0.94 [0.79-1.11]	0.453
Higher	0.87 [0.80-0.95]	0.001	0.80 [0.70-0.91]	0.001	0.71 [0.46-1.09]	0.118	0.70 [0.54-0.91]	0.007
Marital status								
Non-married	Ref.		Ref.		Ref.		Ref.	
Married	0.99 [0.94-1.05]	0.862	0.87 [0.79-0.95]	0.002	1.03 [0.77-1.39]	0.828	0.81 [0.68-0.96]	0.014
Employment status								
Unemployed (40-64 years)	Ref.		Ref.		Ref.		Ref.	
Employed (40-64 years)	1.72 [1.53-1.94]	<0.001	0.95 [0.75-1.20]	0.676	0.69 [0.36-1.30]	0.253	0.64 [0.29-1.41]	0.266
Employed (65+ years)	1.13 [0.98-1.31]	0.096	1.15 [0.90-1.47]	0.265	1.80 [0.92-3.52]	0.087	1.11 [0.57-2.16]	0.754
Retired (65+ years)	1.08 [0.94-1.23]	0.291	1.22 [0.97-1.53]	0.093	1.46 [0.78-2.73]	0.235	2.03 [1.11-3.72]	0.022

Region of birth								
Sweden	Ref.		Ref.		Ref.		Ref.	
Nordic	1.16 [1.04-1.30]	0.009	1.23 [1.05-1.45]	0.011	1.52 [0.89-2.62]	0.126	1.17 [0.87-1.58]	0.290
Other EU	1.14 [0.99-1.32]	0.07	1.43 [1.17-1.74]	0.001	2.63 [1.50-4.60]	0.001	1.31 [0.91-1.89]	0.146
Non-EU	1.84 [1.69-2.02]	<0.001	2.24 [1.95-2.57]	<0.001	2.53 [1.68-3.80]	<0.001	1.28 [0.92-1.77]	0.143
Smoking								
Never smoker	Ref.		Ref.		Ref.		Ref.	
Former smoker	0.98 [0.91-1.06]	0.568	1.00 [0.90-1.13]	0.946	1.08 [0.73-1.61]	0.705	0.99 [0.80-1.22]	0.919
Current smoker	0.62 [0.57-0.68]	<0.001	0.62 [0.53-0.71]	<0.001	0.42 [0.25-0.70]	0.001	0.72 [0.55-0.94]	0.014
Comorbidities								
Overall cardiovascular disease	1.37 [1.29-1.47]	<0.001	1.78 [1.60-1.98]	<0.001	1.48 [1.05-2.09]	0.024	2.70 [2.15-3.38]	<0.001
Type 1 diabetes	1.17 [0.95-1.45]	0.142	1.22 [0.92-1.62]	0.174	0.91 [0.33-2.52]	0.854	1.63 [1.05-2.53]	0.031
Type 2 diabetes	1.24 [1.14-1.35]	<0.001	1.38 [1.23-1.55]	<0.001	1.27 [0.87-1.86]	0.223	1.48 [1.21-1.81]	<0.001
Asthma	0.94 [0.85-1.03]	0.18	1.02 [0.90-1.17]	0.746	1.07 [0.70-1.66]	0.746	1.10 [0.87-1.39]	0.436
Respiratory failure	1.57 [1.38-1.78]	<0.001	1.97 [1.69-2.30]	<0.001	1.56 [0.84-2.89]	0.156	2.00 [1.53-2.61]	<0.001
Interstitial lung disease	0.97 [0.67-1.38]	0.847	1.30 [0.85-1.98]	0.223	0.74 [0.10-5.37]	0.769	1.93 [1.06-3.53]	0.033
Sleep apnea syndromes	0.93 [0.81-1.08]	0.355	1.05 [0.86-1.27]	0.660	1.42 [0.85-2.36]	0.178	1.03 [0.70-1.52]	0.867
Chronic kidney disease	1.46 [1.18-1.80]	0.001	1.52 [1.17-1.98]	0.002	1.09 [0.34-3.46]	0.888	1.96 [1.34-2.88]	0.001
Autoimmune disease	1.28 [1.16-1.42]	<0.001	1.43 [1.25-1.63]	<0.001	1.03 [0.60-1.77]	0.925	1.83 [1.47-2.28]	<0.001
Cancer	1.07 [0.99-1.16]	0.096	1.13 [1.01-1.26]	0.027	0.90 [0.58-1.39]	0.620	1.04 [0.85-1.26]	0.727
Depression	0.78 [0.62-0.98]	0.032	0.83 [0.59-1.17]	0.295	2.61 [0.58-11.64]	0.209	0.49 [0.28-0.87]	0.015
Anxiety	0.99 [0.87-1.14]	0.933	1.05 [0.86-1.27]	0.664	1.23 [0.64-2.35]	0.537	0.91 [0.64-1.32]	0.632
Psychiatric disease	1.43 [1.18-1.73]	<0.001	1.55 [1.16-2.08]	0.003	0.60 [0.15-2.48]	0.485	2.59 [1.61-4.15]	<0.001
Prescribed medications								
Inhaled corticosteroids	1.15 [1.06-1.24]	0.001	1.18 [1.05-1.32]	0.006	1.05 [0.71-1.55]	0.821	1.23 [0.99-1.53]	0.064
Oral corticosteroids	1.06 [0.99-1.14]	0.075	1.06 [0.96-1.17]	0.255	1.15 [0.82-1.62]	0.422	0.81 [0.67-0.98]	0.028
Inhaled SABA	1.04 [0.98-1.11]	0.201	1.03 [0.94-1.13]	0.559	1.07 [0.78-1.47]	0.678	1.04 [0.88-1.24]	0.641
Inhaled LABA	0.99 [0.91-1.06]	0.703	1.02 [0.91-1.14]	0.765	1.20 [0.82-1.77]	0.351	1.03 [0.83-1.27]	0.815
Inhaled SAMA	1.39 [1.23-1.58]	<0.001	1.45 [1.23-1.72]	<0.001	1.29 [0.68-2.45]	0.436	1.76 [1.34-2.32]	<0.001
Inhaled LAMA	1.04 [0.98-1.11]	0.188	1.19 [1.08-1.32]	<0.001	1.49 [1.06-2.09]	0.022	1.04 [0.86-1.25]	0.695
PDE4	0.86 [0.66-1.11]	0.239	0.88 [0.63-1.24]	0.463	0.27 [0.04-1.97]	0.198	1.22 [0.69-2.14]	0.492

Statins	0.90 [0.85-0.96]	0.002	0.87 [0.8-0.96]	0.005	1.09 [0.79-1.50]	0.613	0.83 [0.70-0.98]	0.030
ARB	0.92 [0.86-0.98]	0.010	0.94 [0.86-1.04]	0.230	1.12 [0.82-1.54]	0.464	0.72 [0.60-0.86]	<0.001
Antidepressants	1.30 [1.21-1.39]	<0.001	1.30 [1.17-1.43]	<0.001	1.16 [0.81-1.66]	0.432	1.64 [1.37-1.97]	<0.001
Clinical measurements								
CAT								
<10	Ref.		Ref.		Ref.		Ref.	
≥ 10	1.06 [0.99-1.13]	0.085	1.24 [1.12-1.38]	<0.001	1.46 [1.01-2.11]	0.042	1.30 [1.06-1.59]	0.011
mMRC dyspnea scale								
0	Ref.		Ref.		Ref.		Ref.	
1	1.00 [0.92-1.09]	0.935	0.97 [0.84-1.11]	0.645	1.37 [0.83-2.25]	0.221	1.06 [0.81-1.39]	0.648
2	1.01 [0.92-1.12]	0.791	1.00 [0.86-1.16]	0.976	1.08 [0.62-1.90]	0.784	0.99 [0.73-1.33]	0.944
3	1.04 [0.93-1.16]	0.464	1.11 [0.94-1.30]	0.224	1.34 [0.74-2.41]	0.331	1.10 [0.80-1.50]	0.560
4	0.94 [0.84-1.07]	0.368	0.81 [0.67-0.98]	0.031	0.73 [0.35-1.54]	0.414	0.91 [0.64-1.29]	0.593
Body mass index (BMI)								
Underweight	1.25 [1.09-1.44]	0.002	1.54 [1.27-1.87]	<0.001	1.23 [0.37-4.13]	0.733	1.66 [1.20-2.30]	0.002
Normal BMI	Ref.		Ref.		Ref.		Ref.	
Overweight	0.99 [0.92-1.06]	0.753	0.88 [0.79-0.98]	0.019	2.44 [1.52-3.93]	<0.001	0.76 [0.62-0.93]	0.008
Obese	1.02 [0.95-1.11]	0.524	1.09 [0.98-1.22]	0.125	2.93 [1.81-4.72]	<0.001	1.08 [0.87-1.33]	0.486

adj.HR = adjusted hazard ratios; CI = confidence interval; EU=Europe; Ref=Reference group;
ACE = angiotensin converting enzyme inhibitors; ARB = angiotensin receptor blockers; SABA= short-acting bronchodilator agonists; LABA= long-acting bronchodilator agonists; SAMA = short-acting muscarinic antagonists; LAMA = long-acting muscarinic antagonists; LTRA=leukotriene receptor antagonists; PDE-4 = phosphodiesterase-4 inhibitors. GOLD = global initiative for chronic obstructive lung disease; FEV_1=forced expiratory volume in 1 second; ICU = intensive care unit; CAT = chronic obstructive pulmonary disease assessment test; mMRC = modified Medical Research Council; NA= Not applicable

Models are based on unvaccinated COPD patients with larger sample sizes.
[a] Models containing GOLD or FEV_1 were consistent with the presented results and were excluded due to missingness that resulted in reduced sample sizes.
* Models adjusted for all variables shown except FEV_1 and GOLD
Note: Unadjusted hazard ratios are the same as in Table E3

Table E5. Association between sociodemographics, comorbidities, prescribed medications and clinical characteristics of a population-based COPD cohort in Sweden and three COVID-19 outcomes (infection, hospitalization, and death) that occurred during vaccinated follow-up time from from 1 Jan 2020 until 30 Nov 2021.

	COVID-19 infection				COVID-19 hospitalization				COVID-19 death			
Total number of events	703				248				77			
Person years	46315				46461				46544			
	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value	Unadj. HR [95% CI]	p-value	Adj. HR [95% CI] *	p-value
Sociodemographics												
Age categories †												
40-49	Ref. 40-49		Ref. 40-49									
50-59	0.63 [0.42-0.95]	0.026	0.62 [0.40-0.97]	0.034	Ref. 40-59		Ref. 40-59					
60-69	0.41 [0.28-0.60]	<0.001	0.35 [0.23-0.53]	<0.001	1.35 [0.74-2.45]	0.329	1.40 [0.70-2.81]	0.340	0.23 [0.08-0.66]	0.006	0.33 [0.11-0.98]	0.046
70-79	0.43 [0.29-0.62]	<0.001	0.32 [0.21-0.48]	<0.001	2.43 [1.40-4.21]	0.002	2.13 [1.11-4.10]	0.023	Ref.		Ref.	
80-89	0.52 [0.35-0.76]	0.001	0.36 [0.24-0.56]	<0.001	3.79 [2.16-6.62]	<0.001	2.95 [1.50-5.79]	0.002	2.41 [1.46-3.98]	0.001	1.92 [1.09-3.38]	0.024
90+	0.78 [0.47-1.28]	0.321	0.63 [0.36-1.11]	0.108	3.92 [1.84-8.38]	<0.001	3.75 [1.52-9.26]	0.004	2.18 [0.88-5.41]	0.094	1.88 [0.62-5.69]	0.266
Gender †												
Male	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Female	0.91 [0.8-1.04]	0.178	0.92 [0.80-1.06]	0.252	0.66 [0.53-0.82]	<0.001	0.68 [0.53-0.87]	0.003	0.53 [0.34-0.84]	0.006	0.41 [0.24-0.69]	0.001
Education a												
Primary	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Secondary	0.94 [0.81-1.09]	0.402	0.95 [0.81-1.12]	0.563	0.70 [0.55-0.89]	0.004	0.79 [0.60-1.04]	0.097	0.57 [0.35-0.92]	0.021	0.73 [0.42-1.25]	0.252
Higher	1.12 [0.93-1.34]	0.231	1.15 [0.94-1.41]	0.165	0.82 [0.60-1.12]	0.214	0.94 [0.67-1.33]	0.739	0.35 [0.15-0.78]	0.010	0.36 [0.14-0.93]	0.035
Marital status												
Non-married	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Married	1.06 [0.93-1.21]	0.397	1.09 [0.94-1.26]	0.245	0.87 [0.69-1.09]	0.226	0.85 [0.66-1.10]	0.213	0.97 [0.61-1.55]	0.913	0.96 [0.57-1.63]	0.884
Employment status												
Unemployed (40-64 years)	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Employed (40-64 years)	1.91 [1.40-2.62]	<0.001	1.96 [1.37-2.79]	<0.001	0.47 [0.24-0.93]	0.029	0.58 [0.27-1.27]	0.174	NA [f]	NA [f]	NA [f]	NA [f]
Employed (65+ years)	1.26 [0.91-1.75]	0.163	1.38 [0.90-2.11]	0.137	0.92 [0.52-1.62]	0.766	0.62 [0.29-1.34]	0.225	NA [f]	NA [f]	NA [f]	NA [f]

Retired (65+ years)	1.24 [0.93-1.66]	0.145	1.25 [0.83-1.89]	0.292	1.51 [0.93-2.43]	0.094	0.81 [0.39-1.68]	0.569	NA [f]	NA [f]	NA [f]	NA [f]
Region of birth												
Sweden	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Nordic	0.99 [0.76-1.3]	0.957	1.01 [0.75-1.36]	0.933	1.26 [0.83-1.90]	0.274	1.26 [0.78-2.02]	0.341	1.72 [0.82-3.60]	0.152	1.79 [0.76-4.21]	0.183
Other EU	1.00 [0.69-1.45]	0.997	1.05 [0.71-1.55]	0.815	1.53 [0.91-2.58]	0.109	1.52 [0.86-2.66]	0.148	0.91 [0.22-3.73]	0.896	0.96 [0.23-3.96]	0.951
Non-EU	1.48 [1.19-1.85]	<0.001	1.42 [1.12-1.82]	0.005	1.58 [1.09-2.30]	0.016	2.00 [1.33-2.99]	0.001	2.61 [1.29-5.29]	0.008	3.48 [1.67-7.29]	0.001
Smoking †												
Never smoker	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Former smoker	0.93 [0.78-1.12]	0.452	0.95 [0.79-1.15]	0.603	0.87 [0.65-1.18]	0.386	0.93 [0.68-1.27]	0.658	0.59 [0.35-1.02]	0.058	0.69 [0.39-1.22]	0.206
Current smoker	0.57 [0.46-0.71]	<0.001	0.57 [0.45-0.71]	<0.001	0.45 [0.30-0.65]	<0.001	0.61 [0.41-0.92]	0.017	0.20 [0.09-0.47]	<0.001	0.36 [0.15-0.88]	0.025
Comorbidities												
Overall cardiovascular disease	1.31 [1.15-1.49]	<0.001	1.12 [0.90-1.39]	0.326	1.52 [1.04-2.20]	0.03	1.52 [1.04-2.20]	0.030	2.31 [1.38-3.87]	0.001	1.13 [0.49-2.60]	0.765
Hypertension †	1.29 [1.13-1.47]	<0.001	1.11 [0.95-1.31]	0.184	1.29 [0.99-1.68]	0.062	1.29 [0.99-1.68]	0.062	2.33 [1.47-3.70]	<0.001	1.37 [0.80-2.36]	0.254
Heart failure	1.60 [1.33-1.93]	<0.001	1.34 [1.07-1.68]	0.011	1.66 [1.20-2.29]	0.002	1.66 [1.20-2.29]	0.002	3.50 [2.16-5.66]	<0.001	1.69 [0.94-3.05]	0.081
Type 1 diabetes	2.01 [1.30-3.10]	0.002	1.67 [1.05-2.68]	0.032	2.48 [1.38-4.45]	0.002	2.48 [1.38-4.45]	0.002	7.68 [3.53-16.71]	<0.001	4.92 [1.95-12.42]	0.001
Type 2 diabetes †	1.46 [1.22-1.74]	<0.001	1.41 [1.15-1.73]	0.001	2.17 [1.62-2.92]	<0.001	2.17 [1.62-2.92]	<0.001	2.64 [1.61-4.34]	<0.001	2.00 [1.11-3.58]	0.020
Asthma	1.36 [1.11-1.66]	0.003	1.16 [0.93-1.45]	0.185	1.38 [0.97-1.97]	0.076	1.38 [0.97-1.97]	0.076	1.49 [0.79-2.82]	0.222	1.42 [0.71-2.84]	0.320
Respiratory failure	1.19 [0.83-1.71]	0.352	1.12 [0.75-1.67]	0.586	1.82 [1.09-3.04]	0.022	1.82 [1.09-3.04]	0.022	2.02 [0.87-4.67]	0.101	1.92 [0.76-4.88]	0.168
Interstitial lung disease	1.67 [0.83-3.35]	0.148	1.94 [0.97-3.90]	0.062	2.44 [0.91-6.56]	0.078	2.44 [0.91-6.56]	0.078	4.29 [1.05-17.50]	0.042	4.12 [1.00-16.99]	0.050
Sleep apnea syndromes	1.23 [0.88-1.71]	0.220	0.99 [0.69-1.43]	0.966	1.03 [0.58-1.83]	0.915	1.03 [0.58-1.83]	0.915	3.26 [1.50-7.10]	0.003	2.12 [0.88-5.10]	0.095
Chronic kidney disease	2.64 [1.75-4.00]	<0.001	2.08 [1.27-3.38]	0.003	3.49 [2.00-6.06]	<0.001	3.49 [2.00-6.06]	<0.001	2.98 [0.94-9.46]	0.064	2.28 [0.70-7.45]	0.170
Immunologic disease	1.32 [0.33-5.28]	0.696	0.76 [0.11-5.39]	0.782	2.67 [0.37-19.06]	0.328	2.67 [0.37-19.06]	0.328	NA [f]	NA [f]	NA [f]	NA [f]
Autoimmune disease	1.36 [1.09-1.70]	0.006	1.29 [1.01-1.65]	0.043	1.34 [0.91-1.96]	0.141	1.34 [0.91-1.96]	0.141	1.64 [0.84-3.19]	0.146	1.02 [0.46-2.27]	0.954
Cancer	1.22 [1.03-1.45]	0.025	1.08 [0.88-1.31]	0.474	1.34 [1.00-1.81]	0.053	1.34 [1.00-1.81]	0.053	2.18 [1.34-3.55]	0.002	1.67 [0.97-2.90]	0.066
Depression	1.20 [0.89-1.64]	0.234	1.23 [0.88-1.73]	0.222	1.55 [0.88-2.72]	0.126	1.55 [0.88-2.72]	0.126	0.83 [0.26-2.64]	0.754	1.48 [0.46-4.79]	0.512
Anxiety	0.93 [0.66-1.29]	0.658	0.73 [0.49-1.10]	0.136	0.85 [0.42-1.73]	0.654	0.85 [0.42-1.73]	0.654	0.23 [0.03-1.67]	0.147	0.40 [0.05-2.92]	0.366
Psychiatric disease	1.04 [0.79-1.38]	0.757	1.00 [0.73-1.38]	0.978	1.38 [0.83-2.31]	0.214	1.38 [0.83-2.31]	0.214	0.55 [0.17-1.75]	0.313	1.09 [0.34-3.53]	0.886

Prescribed medications												
Inhaled corticosteroids	1.32 [1.16-1.51]	<0.001	1.28 [1.11-1.48]	0.001	1.55 [1.24-1.93]	<0.001	1.58 [1.23-2.03]	<0.001	1.48 [0.94-2.34]	0.088	1.63 [0.99-2.67]	0.054
Oral corticosteroids	1.28 [1.11-1.48]	0.001	1.24 [1.06-1.46]	0.007	1.44 [1.14-1.82]	0.003	1.30 [1.00-1.70]	0.052	1.54 [0.96-2.47]	0.074	1.41 [0.85-2.34]	0.184
Inhaled SABA	1.10 [0.97-1.26]	0.146	1.09 [0.94-1.26]	0.24	1.16 [0.93-1.45]	0.179	1.28 [1.00-1.64]	0.047	0.98 [0.62-1.54]	0.927	1.27 [0.79-2.05]	0.324
Inhaled LABA	1.20 [1.05-1.36]	0.007	1.15 [1.00-1.33]	0.054	1.43 [1.15-1.78]	0.002	1.40 [1.09-1.79]	0.009	1.10 [0.70-1.72]	0.679	1.35 [0.83-2.20]	0.231
Inhaled SAMA	1.51 [1.12-2.03]	0.007	1.53 [1.11-2.11]	0.010	2.09 [1.37-3.20]	0.001	2.13 [1.34-3.37]	0.001	1.35 [0.54-3.37]	0.517	2.31 [1.05-5.09]	0.038
Inhaled LAMA	1.05 [0.92-1.19]	0.491	1.09 [0.94-1.26]	0.251	1.27 [1.01-1.59]	0.037	1.22 [0.94-1.58]	0.136	0.96 [0.61-1.50]	0.844	1.37 [0.82-2.31]	0.231
Xanthines	1.30 [0.33-5.22]	0.707	1.49 [0.37-5.96]	0.576	NA [f]	NA [f]	NA [f]	NA [f]	NA [f]	NA [f]	NA [f]	NA [f]
LTRA	1.34 [0.95-1.88]	0.096	1.23 [0.85-1.78]	0.281	1.23 [0.67-2.24]	0.505	1.11 [0.55-2.24]	0.779	NA [f]	NA [f]	NA [f]	NA [f]
PDE4	2.45 [1.60-3.73]	<0.001	2.18 [1.37-3.49]	0.001	4.08 [2.34-7.11]	<0.001	3.42 [1.81-6.46]	<0.001	2.29 [0.56-9.35]	0.247	1.25 [0.17-9.05]	0.825
Statins	1.07 [0.94-1.22]	0.301	1.05 [0.90-1.23]	0.551	1.48 [1.19-1.85]	<0.001	0.99 [0.76-1.29]	0.947	1.09 [0.69-1.71]	0.711	0.81 [0.49-1.36]	0.432
ACEIs	1.09 [0.93-1.27]	0.304	1.06 [0.89-1.27]	0.504	1.41 [1.10-1.81]	0.006	1.10 [0.83-1.46]	0.498	1.68 [1.03-2.72]	0.036	1.37 [0.82-2.31]	0.230
ARB	1.00 [0.87-1.16]	0.957	0.94 [0.80-1.11]	0.460	1.05 [0.83-1.34]	0.686	0.75 [0.57-0.99]	0.043	0.66 [0.38-1.14]	0.138	0.38 [0.20-0.72]	0.003
Antidepressants	1.35 [1.17-1.56]	<0.001	1.35 [1.15-1.59]	<0.001	1.33 [1.04-1.69]	0.022	1.61 [1.23-2.11]	<0.001	0.94 [0.56-1.56]	0.799	1.42 [0.84-2.42]	0.191
Clinical measurements												
GOLD Classes b												
Class A	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Class B	1.01 [0.82-1.24]	0.944	1.05 [0.84-1.30]	0.686	1.71 [1.14-2.57]	0.010	1.68 [1.09-2.60]	0.019	0.81 [0.37-1.78]	0.603	0.83 [0.38-1.78]	0.626
Class C	1.10 [0.78-1.55]	0.587	1.18 [0.82-1.70]	0.360	1.49 [0.78-2.85]	0.232	1.52 [0.75-3.08]	0.245	0.32 [0.04-2.52]	0.281	0.35 [0.04-2.71]	0.312
Class D	1.03 [0.80-1.33]	0.817	1.02 [0.78-1.35]	0.861	1.89 [1.19-3.00]	0.007	1.83 [1.11-3.02]	0.018	1.48 [0.65-3.39]	0.350	1.21 [0.51-2.87]	0.663
FEV1 % predicted c												
>=80	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
50-79	0.80 [0.65-0.98]	0.033	0.83 [0.68-1.03]	0.089	1.03 [0.68-1.57]	0.882	1.05 [0.68-1.63]	0.814	0.66 [0.30-1.45]	0.302	0.89 [0.40-2.02]	0.785
30-49	0.78 [0.61-1.00]	0.052	0.85 [0.65-1.09]	0.201	1.76 [1.13-2.75]	0.012	1.76 [1.11-2.79]	0.016	0.83 [0.34-2.01]	0.681	1.23 [0.50-3.02]	0.645
<30	0.85 [0.55-1.30]	0.446	0.90 [0.58-1.41]	0.645	1.62 [0.81-3.25]	0.176	1.86 [0.91-3.80]	0.089	1.56 [0.48-5.08]	0.461	2.32 [0.67-8.02]	0.184
CAT												
<10	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
≥ 10	0.94 [0.82-1.08]	0.365	0.93 [0.8-1.08]	0.341	1.17 [0.92-1.49]	0.208	1.15 [0.87-1.51]	0.326	0.93 [0.57-1.49]	0.750	0.92 [0.55-1.54]	0.741
mMRC dyspnea scale d												

0	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
1	0.98 [0.80-1.18]	0.804	0.95 [0.77-1.17]	0.620	0.95 [0.64-1.42]	0.818	0.94 [0.63-1.39]	0.749	0.97 [0.49-1.93]	0.934	1.00 [0.45-2.22]	0.992
2	1.06 [0.85-1.31]	0.617	1.05 [0.83-1.33]	0.689	1.24 [0.81-1.90]	0.319	1.22 [0.80-1.87]	0.355	0.82 [0.37-1.84]	0.636	1.12 [0.47-2.65]	0.797
3	0.98 [0.76-1.26]	0.866	0.95 [0.72-1.24]	0.690	1.34 [0.85-2.12]	0.201	1.31 [0.83-2.07]	0.241	1.46 [0.67-3.18]	0.341	1.48 [0.62-3.54]	0.380
4	0.93 [0.70-1.24]	0.641	0.88 [0.64-1.20]	0.415	1.14 [0.67-1.91]	0.633	1.09 [0.64-1.84]	0.757	0.82 [0.30-2.22]	0.694	0.74 [0.24-2.29]	0.605
Body mass index (BMI) e †												
Underweight	0.72 [0.47-1.10]	0.124	0.74 [0.48-1.14]	0.170	0.66 [0.31-1.43]	0.294	0.73 [0.34-1.58]	0.427	0.94 [0.28-3.14]	0.923	1.46 [0.50-4.22]	0.488
Normal BMI			Ref.				Ref.				Ref.	
Overweight	1.01 [0.85-1.19]	0.905	0.98 [0.83-1.17]	0.860	1.08 [0.80-1.44]	0.625	1.00 [0.75-1.35]	0.976	0.89 [0.49-1.64]	0.715	0.97 [0.54-1.72]	0.908
Obese	1.20 [1.01-1.43]	0.037	1.13 [0.94-1.35]	0.188	1.43 [1.07-1.91]	0.015	1.33 [0.99-1.80]	0.061	1.53 [0.86-2.71]	0.148	1.55 [0.87-2.76]	0.140

Unadj.HR = unadjusted hazard ratios ; adj.HR = adjusted hazard ratios; CI = confidence interval; EU=Europe; Ref=Reference group;
ACE = angiotensin converting enzyme inhibitors; ARB = angiotensin receptor blockers; SABA= short-acting bronchodilator agonists; LABA= long-acting bronchodilator agonists; SAMA = short-acting muscarinic antagonists; LAMA = long-acting muscarinic antagonists; LTRA=leukotriene receptor antagonists; PDE-4 = phosphodiesterase-4 inhibitors. GOLD = global initiative for chronic obstructive lung disease; FEV_1=forced expiratory volume in 1 second; ICU = intensive care unit; CAT = chronic obstructive pulmonary disease assessment test; mMRC = modified Medical Research Council; NA= Not applicable

*Models adjusted for age, sex, smoking, BMI, diabetes, and hypertension.
† Models including the same variable are not adjusted for it.

Note: hazard ratios for ICU admissions during the vaccinated follow-up period not estimated due to the small case numbers.

[a] Significant trend across education levels for COVID-19 hospitalization ($p < 0.001$).
[b] Significant trend across GOLD ABCD for COVID-19 hospitalization ($p < 0.001$) and death ($p = 0.001$).
[c] Significant trend across FEV_1 % predicted levels for COVID-19 infection ($p = 0.001$), hospitalization ($p < 0.001$) and death ($p < 0.001$).
[d] Significant trend across mMRC dyspnea scale for COVID-19 infection ($p < 0.001$)
[e] Significant trend across BMI levels categories for COVID-19 infection ($p < 0.001$), hospitalization ($p < 0.001$) and death ($p < 0.001$).
[f] NA introduced due to few observations.

Table E6. Sample sizes of observations in regression models for the unvaccinated follow-up time* assessing the association between different characteristics and the risk for four COVID-19 outcomes (infection, hospitalization, intensive care unit (ICU) admission and death) among patients in a population-based COPD cohort in Sweden from 1 Jan 2020 to 30 Nov 2021.

	COVID-19 infection				COVID-19 hospitalization				COVID-19 ICU admission				COVID-19 death			
	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Age categories	6068	6068	6068	4995	2649	2649	2649	2178	221	221	221	199	803	803	803	621
Sex	6068	6068	6068	4995	2649	2649	2649	2178	221	221	221	199	803	803	803	621
Comorbidities[§]	6068	6068	6068	4995	2649	2649	2649	2178	221	221	221	199	803	803	803	621
Medications [ll]	6068	6068	6068	4995	2649	2649	2649	2178	221	221	221	199	803	803	803	621
Smoking	4995	4995	4995	4995	2178	2178	2178	2178	199	199	199	199	621	621	621	621
Body mass index	5395	5395	5395	4995	2387	2387	2387	2178	203	203	203	199	706	706	706	621

*Models are based on the unvaccinated follow-up time with larger sample sizes.

[a] Crude models
[b] Adjusted for age and sex
[c] Adjusted for age, sex, diabetes, and hypertension.
[d] Adjusted for age, sex, diabetes, hypertension, body mass index and smoking
[§] Include: Overall cardiovascular disease, hypertension, heart failure, type 1 and type 2 diabetes, asthma, chronic kidney disease, autoimmune diseases, cancer, psychiatric conditions, and anxiety.
[ll] Include: included inhaled (ICS) and systemic corticosteroids, long- and short-acting beta-agonists (LABA, SABA), long- and short- acting muscarinic antagonists (LAMA, SAMA), phosphodiesterase (PDE4) inhibitors, leukotriene receptor antagonists (LTRA), angiotensin converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARB), and statins

Table E7. Overview of register data sources for the present study on characteristics and risk factors of COVID-19 in a Swedish population-based cohort of COPD from 1 Jan 2020 to 30 Nov 2021.

Register Type	Register Name	Acronym	Administrator	Data	Assessment period*	Reference
Healthcare register	National Patient Register	NPR	Swedish National Board of Health and Welfare	Contains data of all in-patient care from public and private practitioners in Sweden	5 years for pre-index** comorbidities and after index data for COVID-19 outcomes	[E1]
Healthcare register	Swedish Cause-of-Death Register	SCDR	Swedish National Board of Health and Welfare	Database of all deaths registered in Sweden	5 years pre-index, and after index for COVID-19 outcomes	[E2]
Drug register	National Prescribed Drugs Register	NPDR	Swedish National Board of Health and Welfare	Contains information about all dispensed prescriptions in pharmacies	1 years before index	[E3]
Healthcare register	SmiNet (national register of notifiable diseases reporting)	SmiNet	The Public Health Agency of Sweden	Maintained by the public health agency of Sweden, contains reports of infectious diseases including COVID-19 and vaccination.	After index for COVID-19 outcomes	[E4]
General population register	Register of the Total Population	RTB	Statistics Sweden (SCB)	Has information on the Swedish population	Latest record in the past 5 years pre-index	[E5]
Socioeconomic register	Longitudinal Integrated Database for Health Insurance	LISA	Statistics Sweden (SCB)	Database with sociodemographic data such as household statistics, health insurance, employment, income, and	Latest record in the past 5 years pre-	[E6]

	and Labor Market Studies			education	index	
Quality register	Swedish National Airways Register	SNAR	Swedish regions	Database with detailed data from individuals with chronic obstructive respiratory disease from primary, secondary, tertiary, and in-patient care	5 years pre-index	[E7]
Healthcare register	Swedish Intensive Care Registry	SIR	Region Värmland	A register for all intensive care unit cases	After index for COVID-19 outcomes	[E8]

COPD = chronic obstructive pulmonary disease; COVID-19 = coronavirus disease 2019.

*Selected duration for this study
** Index date is 1 Jan 2020.

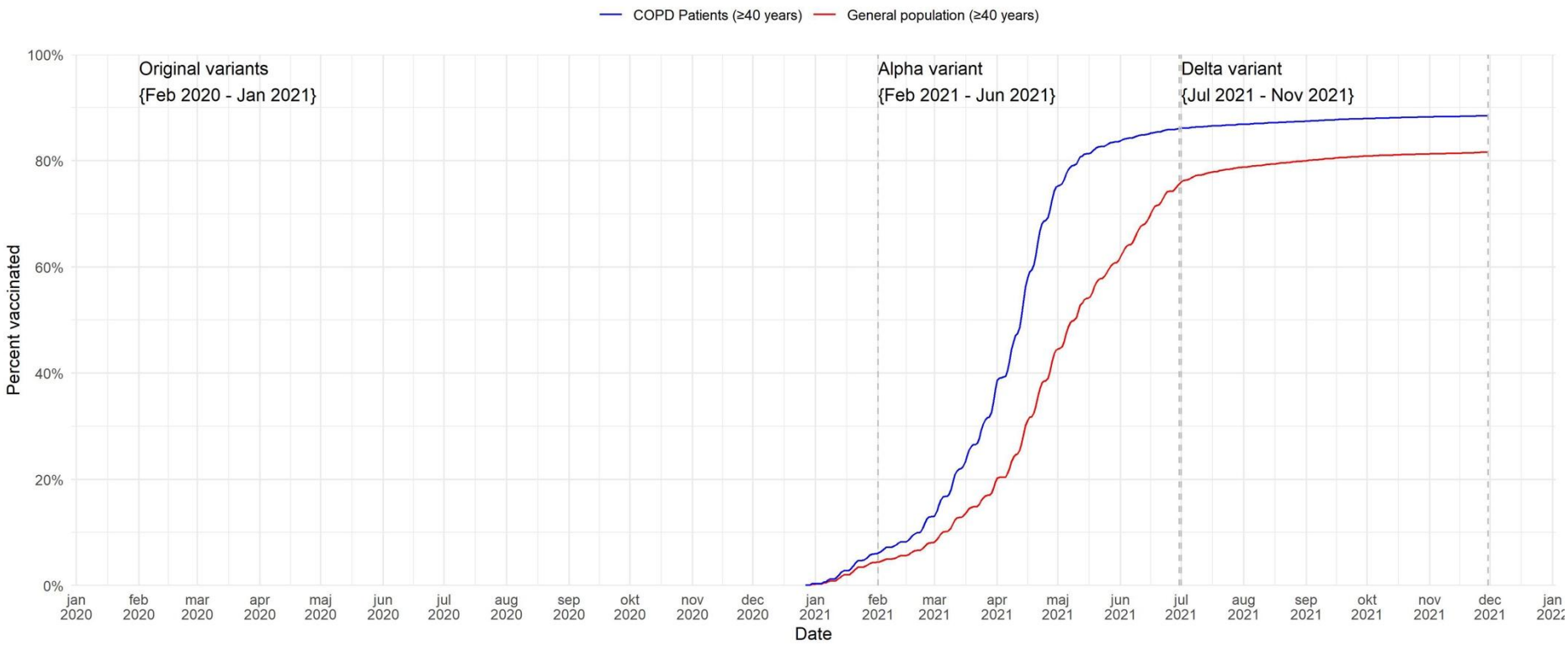

Figure S1: First Coronavirus vaccination uptake in COPD patients (≥40 years) and the general population (≥40 years) from Jan 1, 2020, to Nov 30, 2021 in Sweden.

References

E1. Ludvigsson JF, Andersson E, Ekbom A, Feychting M, Kim J-L, Reuterwall C, Heurgren M, Olausson PO. External review and validation of the Swedish national inpatient register. BMC Public Health. 2011 Dec;11(1):450.

E2. Brooke HL, Talbäck M, Hörnblad J, Johansson LA, Ludvigsson JF, Druid H, Feychting M, Ljung R. The Swedish cause of death register. Eur J Epidemiol. 2017 Sep;32(9):765–73.

E3. Wettermark B, Hammar N, MichaelFored C, Leimanis A, Otterblad Olausson P, Bergman U, Persson I, Sundström A, Westerholm B, Rosén M. The new Swedish Prescribed Drug Register—Opportunities for pharmacoepidemiological research and experience from the first six months. Pharmacoepidem Drug Safe. 2007 Jul;16(7):726–35.

E4. SmiNet — Folkhälsomyndigheten [Internet]. [cited 2022 Mar 29]. Available from: http://www.folkhalsomyndigheten.se/smittskydd-beredskap/overvakning-och-rapportering/sminet/

E5. Ludvigsson JF, Almqvist C, Bonamy A-KE, Ljung R, Michaëlsson K, Neovius M, Stephansson O, Ye W. Registers of the Swedish total population and their use in medical research. Eur J Epidemiol. 2016 Feb;31(2):125–36.

E6. Ludvigsson JF, Svedberg P, Olén O, Bruze G, Neovius M. The longitudinal integrated database for health insurance and labour market studies (LISA) and its use in medical research. Eur J Epidemiol. 2019 Apr;34(4):423–37.

E7. Stridsman C, Konradsen J, Vanfleteren L, Pedroletti C, Binnmyr J, Edfelt P, Fjällman Schärberg K, Sjöö Y, Nyberg F, Lindberg A, Tunsäter A, Ekberg-Jansson A. The Swedish National Airway Register (SNAR): development, design and utility to date. European Clinical Respiratory Journal. 2020 Jan 1;7(1):1833412.

E8. The Swedish Intensive Care Registry (SIR) [Internet]. [cited 2022 May 17]. Available from: https://www.icuregswe.org/en/